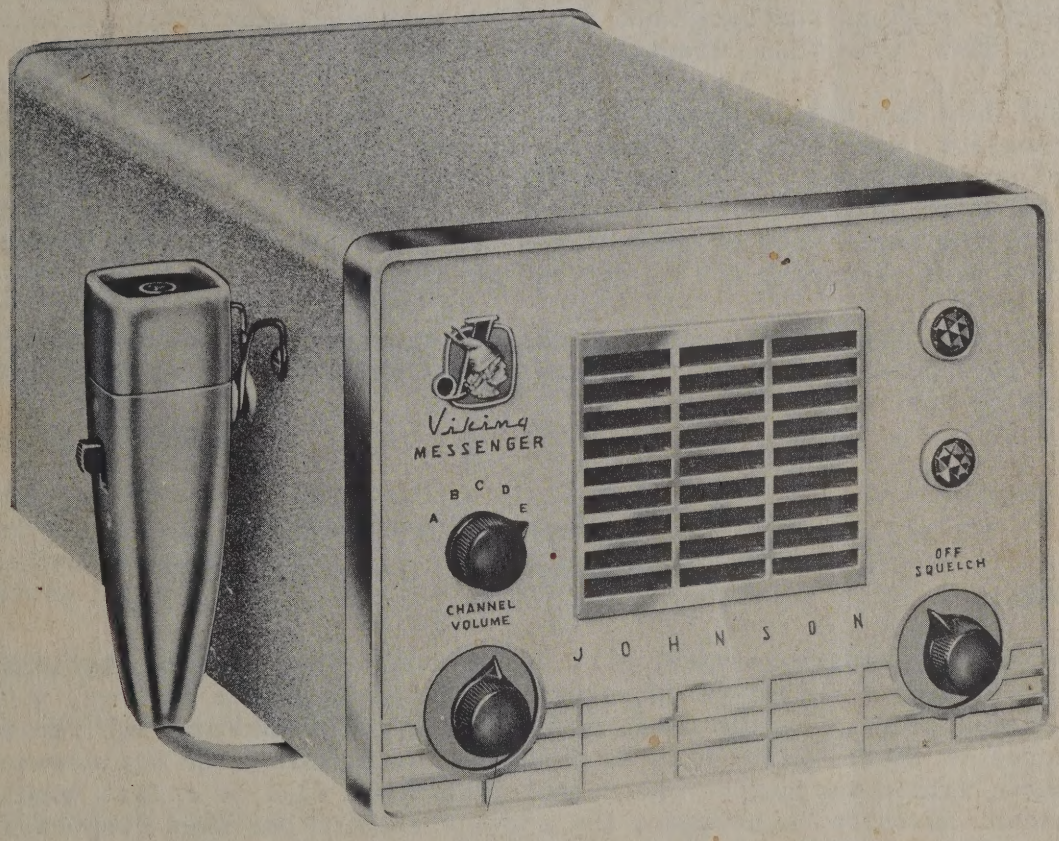
JOHNSON

Viking MESSENGER



TWO WAY RADIO TRANSCEIVER

INSTRUCTION MANUAL

E. F. JOHNSON COMPANY
WASECA, MINNESOTA

E. F. JOHNSON CO.
TWO-WAY RADIO EQUIPMENT

STANDARD WARRANTY

ADOPTED AND RECOMMENDED BY THE ELECTRONIC INDUSTRIES ASSOCIATION

The E. F. Johnson Company warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part, in exchange for any part of any unit of its manufacture which under normal installation, use and service disclosed such defect, provided the unit is delivered by the owner to us or to our authorized radio dealer or wholesaler from whom purchased, or authorized service station, intact, for our examination, with all transportation charges prepaid to our factory, within ninety days from the date of sale to original purchaser and provided that such examination discloses, in our judgment, that it is thus defective. *(See Note)

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, unauthorized modifications, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products.

*SPECIAL NOTES:

To speed-up warranty repair service, most of our authorized service stations offer an optional plan. As an alternative to returning equipment to the factory, with transportation charges prepaid by the user, authorized service stations can repair immediately units delivered to them. Parts will be furnished at no charge as replacements for defective parts within warranty. Under this plan there will be a flat handling charge of $5.00, except in those cases where the service station has been responsible for installation. This nominal charge is generally equivalent to the costs incurred by the customer in returning equipment to the factory.

If licensing delays defer the installation and/or use of two-way radio equipment, the 90 day warranty period may be extended at our option to a maximum of 120 days. Please retain your sales slip or bill of sale to establish warranty dates.

Radio receivers operating in the 27 megacycle band may be adversely affected by ignition noise from the vehicle in which they are installed or from passing vehicles. No warranty as to the performance of these equipments is expressed or implied when operating under conditions of external ignition or other electrical interference.

Performance can not be guaranteed if other than Johnson approved crystals are used.

2/60

FOREWORD

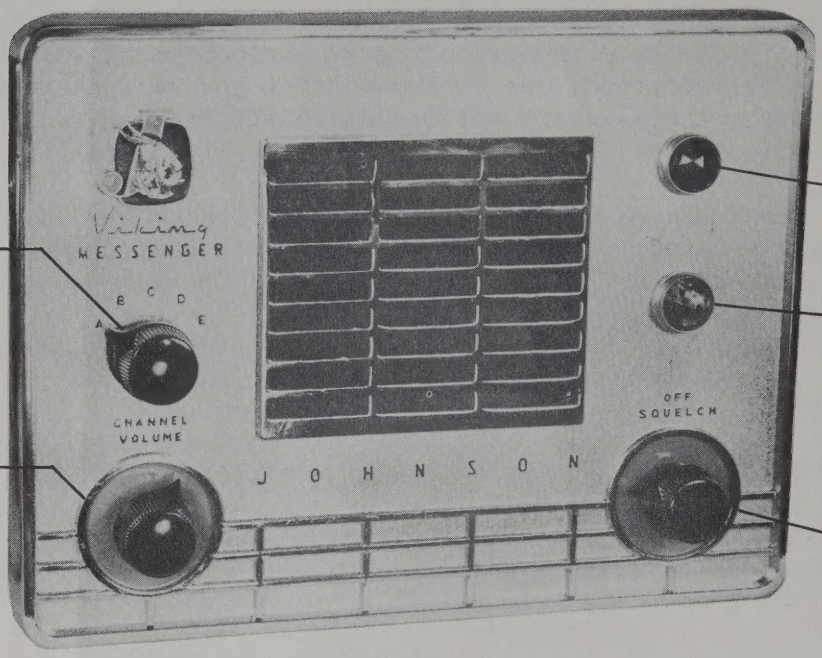
The E. F. Johnson Company sincerely hopes that you will obtain the excellent performance engineered and manufactured into your Messengers. This Instruction Manual has been written to promote your understanding of the equipment which will lead to greater satisfaction in its operation. We recommend that you read thoroughly the sections on General Information, Installation and Operating the Messenger.

TABLE OF CONTENTS

	Page
General Information	1
a) Introduction	1
b) Inspection and Preliminary Test	1
c) Citizens Radio License	2
d) Transmitter Identification Card	3
Installation	4
a) Antennas	4
b) Equipment Location and Placement	5
c) Power Connections	5
d) Electrical Noise Interference	6
Operating the Messenger	6
a) General Operation and Controls	6
b) Use of Call Signs and Operating Procedures	8
c) Multi-Channel Operation	9
d) Operating Notes	10
Service and Maintenance	11
a) Simple Troubles and Routine Maintenance	11

Top and Bottom Chassis Views
Schematic
Channel-Crystal List
"10" Signals
Antennas and Other Accessories

MESSENGER



CHANNEL SWITCH. SELECT DESIRED OPERATING CHANNEL.

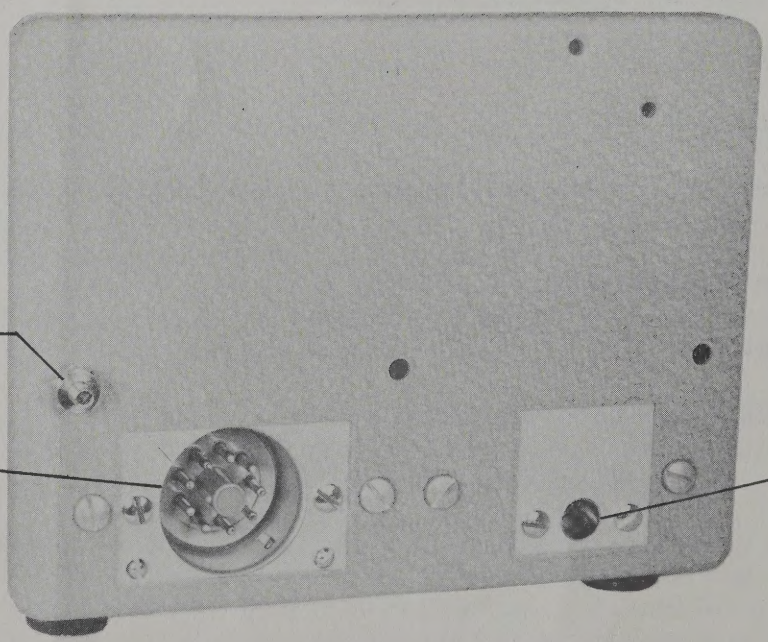
VOLUME CONTROL. ADJUST FOR SATISFACTORY VOLUME LEVEL.

INDICATES TRANSMITTER ON WHEN MICROPHONE SWITCH IS DEPRESSED.

INDICATES POWER ON.

OFF-ON SWITCH AND SQUELCH CONTROL. ADJUST JUST TO POINT WHERE UNDESIRED NOISE IS CUT OFF.

FRONT VIEW



GROUNDING AND MOBILE MOUNTING SCREW.

POWER SOCKET. PLUG POWER CORD OR CABLE IN HERE. OBSERVE MATING OF KEYWAY.

ANTENNA SOCKET. PLUG IN ANTENNA LEAD-IN HERE.

REAR VIEW

General Information

a) Introduction

Your Johnson Viking Messenger two-way Citizens Radio equipment is the finest available. The superheterodyne receiver is very sensitive and selective thus making possible the reception of weak signals and the rejection of undesired, interfering signals. The transmitter is highly efficient which results in extended communication range. The famous Johnson Viking audio quality has been designed into the Messenger - it is noted for its extraordinary, good audio. It is well designed, ruggedly built and dependable. Although it will withstand considerable abuse, it should be accorded the treatment given any piece of fine electronic equipment such as protection from water, dirt and unnecessary shock.

Some of the outstanding features of the Messenger are:

a) Highly selective and sensitive superheterodyne receiver
b) Crystal control of both receiver and transmitter - always on channel
c) Adjustable squelch control
d) Flip-of-the-switch five channel operation
e) Automatic volume control
f) Automatic noise limiter
g) Meets all Federal Communications Commission specifications
h) Maximum legal power
i) No tuning required regardless of channels used
j) Specifically designed for mobile operation and ease of mounting
k) Highly reliable
l) Exceptionally clear sound
m) Wide temperature range -35°F to +130°F

The Messenger has been completely tested and tuned at the factory - NO TUNING IS NECESSARY when used with Johnson approved antennas. The equipment covers all 23 channels of the Class D Citizens Radio Band - any five sets of crystals (five channels) may be used in the equipment at one time - crystals are merely plugged-in for the channel desired without tuning or adjustment (see section on OPERATION).

b) Inspection and Preliminary Test

Carefully inspect your Messengers for possible shipping damage. Report any damage immediately to the distributor or transportation service - not to the E. F. Johnson Company. The carton includes the Messenger Transceiver, an AC power cord, DC power cable (universal models only), one each spare fuse AC and DC, instruction manual, microphone holder, FCC License Application Form 505, FCC Part 19 Citizens Radio Rules and Regulations, FCC Transmitter Identification Card Form 452-C. Examine all packing materials carefully to avoid discarding above items. Save the carton and packings for future use (service return, etc.).

The equipment should now be given a preliminary short test. Note that one end of the power cord has a connector with nine small holes and a large center hole with a groove or keyway. This connector should be plugged into the rear of the Messenger being careful to see that the keyway is correctly mated with the key in the corresponding plug on the Messenger. The AC cord has a two prong, double fused plug on the other end of the cord. After checking that both fuses are in

the plug, plug into a 115 volt, 50-60 cycle, AC outlet. Set the CHANNEL selector knob to position "A" and the volume control (lower left knob) at full clockwise position. Turn the OFF-SQUELCH control clockwise just to the point where the switch clicks on. In approximately 30 seconds the bottom, amber colored, indicator light should come on and a soft rushing noise should be heard in the loudspeaker (if SQUELCH control is turned too far clockwise no noise will be heard). This completes the preliminary test. Turn unit OFF and remove power plug from outlet.

If the indicator light does not come on or noise is not heard in the loudspeaker, notify your dealer of the difficulty immediately.

c) Citizens Radio License

DO NOT TRANSMIT WITH YOUR EQUIPMENT UNTIL YOU HAVE RECEIVED YOUR LICENSE FROM THE F.C.C. Illegal operation can result in severe penalties.

Some of the more important rules in Citizens Radio Service are:

(1) You may not engage in communications for hire or broadcasting (radio programs, music, etc.) and must not use profane, indecent or obscene language.

(2) Any citizen 18 years of age or older can obtain a license. Anyone of any age can operate the equipment. However, it is the responsibility of the licensee to have the equipment operated properly.

(3) The tip of the antenna may not extend more than 20 feet above the highest point of the building or natural formation upon which it is mounted. If the antenna is mounted upon an existing antenna support structure, the tip of the antenna may not extend above the highest point of such structure.

(4) You may not use your equipment for any purpose contrary to federal, state or local law.

(5) Equipment adjustments of the transmitter which can affect proper operation must not be made by anyone other than a licensed commercial radio operator with a first or second class radiotelephone license.

(6) Transmissions should be kept to the minimum length practicable to avoid unnecessary interference to other stations sharing the same channel. There is no time restriction when communicating between units of your own (or group) but when communicating with other than your own group you cannot communicate more than 5 minutes for each 7 minute period. No general calls (CQ calls) may be made, you must always call a specific station.

Fill out the license application, FCC Form 505, as soon as possible, have it notarized and forward it to Federal Communications Commission, Washington 25, D. C.

Read the Form 505 Instructions carefully, then detach the WORK SHEET which should be completed first. Your Messengers will be operated in Class D service so fill out the WORK SHEET as follows:

Item 1 - Under "1(a) Frequencies" and "1(b) Emission", write "Class D". Under "Mobile" write the total number of transceivers you intend to use (if you plan to use two now and add units later, list the total number eventually contemplated). Note that all Class D units are considered mobile even when operated at fixed or base stations.

Item 2 - Follow item 2, Instructions

Item 3 - Requires no answer - draw lines through blanks signifying you have read this item.

Item 4 - Check "D" box

Item 5 - Write "In the State (or States) of .....

Item 6 - No Answer required - draw line through

Item 7 - Check box marked "Individual" or other box if it applies to your case.

Item 8 - Check box 8(a). If answer is YES, omit answering 8(b) and 8(c). If answer is NO, give name of owner and answer 8(b). The answer to 8(b) must be YES. Answer to 8(c) must be YES.

Item 9 - Follow Instructions. Avoid saying only "For personal communications".

Item 10 - No answer required - draw line through

Item 11 - Check box marked YES

Item 12 - No answer required - draw line through

Item 13 - No answer required

Item 14 - No answer required

Items 15 and 16 are to be answered only by applicants which are corporations, associations, or unincorporated associations.

Check appropriate box below signature of applicant.

When the WORK SHEET has been completed transfer the information to the application form (be sure the carbons are in place), have it notarized and send all copies (including carbons) except the work sheet to Federal Communications Commission, Washington 25, D. C.

d) Transmitter Identification Card

When you have received your license, fill out the Transmitter Identification Card, FCC Form 452-C and attach one to each Messenger (this is required by law) with the plastic protective cover, washers and screws provided. Attach to side of cabinet - not on top or bottom. Fill out card as follows:

1. Enter call sign which is on upper right corner of your license.

2. Enter name of licensee.

3. Enter here home address (or address where license is kept) of individual or address of business if license is kept at business location.

4. Already answered.

5. Licensee should sign his name in space provided.

Obtain expiration date from lower right corner of license and enter it in space provided after "Current FCC Authorization for this Transmitter Expires....." Obtain equipment serial number at rear of unit and enter it in box provided.

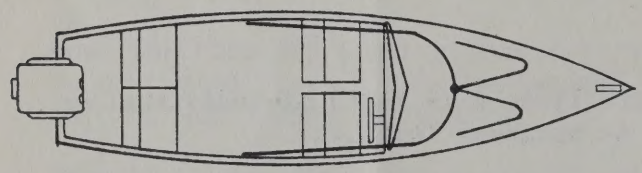
Installation

a) Antennas

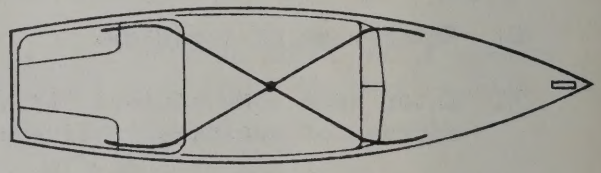
The results you obtain with your Messengers will be determined in large part by the antenna systems used. All Johnson antennas are well matched for maximum performance. Antennas should be as high as possible and as clear of surrounding objects (such as buildings, trees, power lines, etc.) as the location permits. Height of antenna is very important - an increase in height from 25 feet above ground to 50 feet above ground may increase communication range by 50%. The FCC Rules state that the tip of the antenna may not extend more than 20 feet above the highest point of the building or natural formation upon which the antenna is mounted. If it is possible to increase the antenna height by an additional 15 feet or more by placing the antenna on another building further away, it is well worthwhile even if the antenna lead-in has to be extended to as much as 200 feet (the FCC Rule limiting lead-in length to 25 feet has been amended to permit any length).

The FCC Rule also states that if the antenna is mounted upon an existing antenna structure, the tip of the antenna may not extend above the highest point of such structure. Some users have increased the height of their television antennas by adding additional tower sections and then clamping an outrigger arm to the side of the tower upon which arm is mounted the Messenger antenna. The increased height of the television antenna usually results in improved television reception and the increased height of the Messenger antenna results in improved two-way communication. The Johnson model 137-808 Ground Plane Antenna can be mounted on an outrigger arm. Neither the vertical antenna element nor drooping ground rods of the antenna should touch the tower or its guy wires. The tower and outrigger arm may be steel with the antenna mounted at least six feet away from the tower when the tower is steel. Since a steel tower sometimes affects antenna operation by reducing the communication range in the direction of a line from the antenna through the tower (tower "blocks" the signal, so to speak), the antenna should be mounted on the tower so that any possible blocking will occur in the least desired area of coverage.

Mobile antennas used in automobiles, trucks or boats should be mounted after the location of the Messenger within the vehicle has been determined. For example, if the Messenger is mounted on the right side of an automobile, the antenna lead-in is more easily routed if the antenna is mounted on the right side. The foredeck of a metal boat is an excellent antenna location. Wood or Fiberglass boats should preferably utilize a metal ground plate of at least six square feet area (2 x 3) attached to the outside of the hull. The base of the antenna mount should be connected to the ground plate with as short and heavy a copper wire as possible. As a substitute for a ground plate, four nine foot lengths of copper wire (#14 or larger) may be attached to the antenna base mount with the wires running outward as radially as possible as shown below:



Wood Runabout - antenna mounted on foredeck.



Wood Cabin Cruiser - antenna mounted on top of cabin.

These wire ground radials may be clamped or stapled to the inside of the hull or superstructure and need not be insulated. The free end of the radial should not touch the radial if it has to be bent back upon itself as may be necessary in small boats.

All Johnson antennas include detailed mounting instructions.

The Messenger should not be operated without the antenna plugged into the small socket at the rear of the cabinet.

b) Equipment Location and Placement

Messenger units at base or fixed station locations should be placed on a desk or table, within arms reach, in an area normally attended by some person who can reply to incoming calls. The antenna lead-in should be routed to the chosen equipment location. Most base station equipments are AC power operated where the AC power cord is merely inserted into the nearest 115 volt 50-60 cycle AC outlet. Where necessary, ordinary electric extension cords may be used since the Messenger draws less than 70 watts power. A ground wire should be connected to the grounding screw on the rear of the Messenger and then connected to the nearest water pipe (not steam or heating pipe) or directly to a grounding rod driven several feet into the soil. This is to avoid possible shock in the event of equipment failure.

Mobile installations - automobiles, trucks, boats, aircraft, etc. - should place the Messenger units within convenient reach of the driver or pilot whenever possible. The Johnson model 251-828 Universal Dash Mounting Kit includes a mounting bracket, all hardware and detailed instructions for the mounting of a Messenger in mobile installations.

c) Power Connections

Messenger units are of two basic types. One type, No. 242-126, is for 115 volt AC power operation only. The other type is for both AC and DC operation (Universal) and is designated by No. 242-127 (115 volt AC and 6 volt DC), No. 242-128 (115 volt AC and 12 volt DC), No. 242-129 (115 volt AC and 24 volt DC) and No. 242-138 (115 volt AC, 230 volt AC and 12 volt DC).

The AC only model is merely plugged into a 115 volt 50-60 cycle outlet for power or ordinary electric extension cord if there is no outlet nearby.

The Universal models are designed so that no switching is necessary to go from AC to DC operation or vice versa. It is only necessary to plug the appropriate cable into the mating plug on the rear of the Messenger. The keyway in the large center hole of the nine contact connector at one end of the power cable must mate with the key on the connector mounted on the rear of the unit. Do not force - be sure keyway and key are mated. The cable for AC operation is equipped with a double fused power plug for equipment protection and to facilitate fuse replacement. After the plug has been checked to see that both fuses are inserted, it may be placed in an appropriate AC outlet for power.

FUSE CHART

ONLY SPECIFIED FUSES SHOULD BE USED

MODEL	OPERATING VOLTAGES	FUSE
242-126	115 V. 50-60 cycles	2 AMP, 1/4 x 1 1/4, Type AGC2
242-127	115 V. 50-60 cycles	2 AMP, 1/4 x 1 1/4, Type AGC2
	6 V. D.C.	20 AMP, 1/4 x 1 1/4, Type SFE-20
242-128	115 V. 50-60 cycles	2 AMP, 1/4 x 1 1/4, Type AGC2
	12 V. D.C.	9 AMP, 1/4 x 7/8, Type SFE-9
242-129	115 V. 50-60 cycles	2 AMP, 1/4 x 1 1/4, Type AGC2
	24 V. D.C.	4 AMP, 1/4 x 5/8, Type SFE-4
242-138	115 V. 50-60 cycles	2 AMP, 1/4 x 1 1/4, Type AGC2
	230 V. 50-60 cycles	1 AMP, 1/4 x 1 1/4, Type AGC1
	12 V. D.C.	9 AMP, 1/4 x 7/8, Type SFE-9

The DC power cables have two colored wires one of which is black. In all installations, the black wire should be connected to the frame, body or motor (ground) of the vehicle regardless of whether the positive or negative terminal of the battery is grounded. Use a conveniently located bolt to clamp (connect) the black wire to the frame, body or motor being sure that all paint, dirt or grease has been carefully removed so that a good electrical connection is achieved. The remaining wire which has the fuse holder (be sure appropriate fuse is in holder) is connected to a "hot" voltage point such as the accessory terminal of the ignition switch. Connection to the ignition switch prevents the equipment being left on accidentally when away from the car. If in doubt as to the proper connection, your local service station can identify it for you. Be sure that power connections are clean and tight.

Once installed, power cables may be left connected and the Messenger transferred from car to home, for example, simply by plugging in the cable at hand.

d) Electrical Noise Interference

Automobile, truck and boat engines can create severe electrical noise interference due to their ignition and generator systems. This noise is not only annoying by its sound in the loudspeaker but can result also in materially reduced communication range. The Automatic Noise Limiter in the Messenger will prevent the majority of noise from being heard in the loudspeaker but cannot compensate for the reduction in range due to the electrical noise. For this reason, it is strongly recommended that each mobile installation be equipped with the Johnson No. 250-801 Electrical Noise Suppression Kit which includes suppressors, filter capacitors, shielded cables and detailed installation instructions.

Operating the Messenger

a) General Operation and Controls

Plug the antenna lead-in into the small socket at the rear of the cabinet and plug the power cord or cable into the large socket. Connect the power cable to the power source.

Operation of the Messenger is very simple. To send a message, merely depress the microphone switch while talking directly into or across the microphone in a normal tone of voice and release the switch to listen. Do not operate the Messenger without the antenna plugged into the small socket on the rear of the cabinet.

There are only three controls, CHANNEL, VOLUME and OFF-SQUELCH.

The CHANNEL switch is used to select the channel upon which it is desired to transmit and receive. Messenger units are supplied with channel control crystals (one for transmitter, one for receiver) for one channel and are normally plugged into channel A. The Messenger transmits and receives on the same channel. See section (c), below, for information on multi-channel operation. Use Johnson crystals only.

The VOLUME control is used to control the volume of the received signal as is done in an ordinary radio or television set. Turning the volume control clockwise or to the right increases the volume.

The OFF-SQUELCH control serves both as a switch to turn the unit on or off and as an adjustable squelch control to "squelch" undesired background noise when the unit is not receiving a signal or message. The control is turned clockwise (to the right) just to the point where the switch clicks on. With the VOLUME (other knob) turned up to ten o'clock position (a convenient means of describing the knob pointer position as though it were the hour hand on a clock), a rushing sound or noise will be heard in the loudspeaker. As the squelch control is advanced clockwise, a point will be reached where the sound in the speaker is squelched or cut off. The receiver will now be quiet until another station "calls-in" and the received signal "breaks" the squelch, thus being heard. Normally, the squelch knob will point between 9 and 12 o'clock depending upon the noise background.

As the squelch knob is turned further to the right, it takes a stronger received signal to break the squelch. The squelch knob should be advanced just to the point where the background noise is cut off so the weakest possible signal may be heard thus providing maximum range and yet eliminating annoying background noise. As mobile units move away from the base station, signals become weaker so readjustment of the squelch may be necessary. To achieve maximum possible range it may be necessary to turn the squelch to the left and put up with the background noise because the signal will be too weak to break the squelch even though the signal will be understandable. VOLUME should be adjusted for satisfactory listening level.

Two indicator lights are provided on the front panel to indicate proper operation. The amber colored, lower, indicator serves as a reminder that the equipment is turned on and ready for operation. When first turned on it takes approximately 30 seconds for the tubes to warm up and the indicator to light. The red, upper, indicator indicates proper transmitter operation. It lights immediately when the microphone switch is depressed and will increase and vary in intensity as the microphone is spoken into, thus indicating that the voice is being transmitted. Neon bulbs provide very long life and should not need replacement.

MESSENGER OPERATION - SUMMARY

1. Turn OFF-SQUELCH control to right to turn on unit.

2. Adjust VOLUME control for comfortable listening level when receiving signal.

3. Adjust SQUELCH control to just cut off the background noise when no station is being received. If SQUELCH control is turned too far right it may cut off the desired signal. To hear weaker signals that are "down in the noise", turn the SQUELCH to the left and let the background noise come through.

4. To transmit, depress the microphone switch. The red indicator will glow indicating that you are "on the air". Speak directly into the microphone in a normal tone of voice. You cannot receive while transmitting, so release the microphone switch to hear the reply.

b) Use of Call Signs and Operating Procedure

Each licensee is issued a call sign by the Federal Communications Commission which identifies his stations. There are 24 radio districts in the U. S. and all Class D Citizen Radio station call signs begin with prefixes 1W through 24W depending upon geographical location.

Call signs must be used at the beginning and end of each series of communications and at least once every ten minutes if transmissions are longer than ten minutes. Proper procedure is shown in the following EXAMPLE:

When the operator of station 16W0413 unit 1 wishes to communicate with station 16W0413 unit 2 (which must be on the same channel), he transmits "16W0413 unit 2 from 16W0413 unit 1, over".

The station called replies "16W0413 unit 1 from 16W0413 unit 2, go ahead".

16W0413 unit 1 then proceeds with his message. When he wishes unit 2 to reply he says "over" and releases the microphone switch. Operators soon become accustomed to the change in background noise when the other station goes off the air, making the "over" unnecessary.

At the termination of communication the operator says "This is 16W0413 unit 1 out" and the other station says "This is 16W0413 unit 2 out". "Out" means out of communication for the time being.

Stations in the Citizens Radio Service use the 23 channels in the 27 megacycle band on a shared basis. Many people share this band, hence brevity and good operating procedure will save time and make best use of the channels available with minimum interference.

The term "Roger", as a phonetic for "R" meaning "received and understood", is widely used. If it is necessary to break into a conversation between two stations, transmit "break, break" and wait for an acknowledgement.

The so-called "Ten" signals are widely used in two-way radio communications to save time and reduce interference. Use of them will identify you as a qualified and informed two-way radio communicator. Copies of the "Ten" signals are attached to the back of this instruction manual. If you wish to know the location of a mobile

or other unit merely say "ten twenty". In like manner, any ten signal will convey its basic meaning. As operators memorize the Ten signals, common exchanges are greatly expedited.

c) Multi-Channel Operation

Your Messenger may be operated on any of the 23 channels allocated for the Class D Citizens Radio Service. Any five channels may be installed in the Messenger at one time giving instant "flip-of-the-switch" coverage of five channels. The Messenger is supplied with one set of crystals for one channel (placed in channel A switch position) since this will take care of average requirements. Sets of crystals (two crystals, one for the receiver, one for the transmitter) may be purchased from your distributor if additional operating channels are desired. Use Johnson crystals only. Multi-channel operation is advantageous in avoiding interference on a specific channel and in setting up more complex communication networks.

For example, in areas where many stations are operating, you may arrange to contact your other station every thirty minutes on the hour and half hour on, say, channel A. If contact is not made or contact is poor due to interference, by prearrangement you will both shift to channel C two minutes after the scheduled time in the hope that another channel will be clearer. Various arrangements may be made with perhaps more than one channel shift necessary to dodge extremely heavy interference. Obviously, you must both be on the same channel to hear each other so bear this in mind in making arrangements.

Yacht clubs and marinas sometimes set up a base station on a given channel and boats use this as a calling channel to call the base and exchange communications. Boats also call other boats on this channel but once contact has been established they shift to another "talking" channel and thus leave the basic calling channel clear for use by others. Stations usually leave their units set on the calling channel so anyone wishing to contact them will be heard. Squadron maneuvers or boating parties can use a channel other than the calling channel to coordinate their operations yet may instantly switch over to the calling channel for emergencies, weather information, assistance, etc.

A list of crystals and channel numbers is provided at the rear of this manual.

TO ADD OR CHANGE CHANNELS

1. Remove the Messenger from its mount and unplug the power cable and antenna cable at the rear of the cabinet.

2. Remove the four screws at the rear of the cabinet.

3. With cabinet setting on flat surface, grasp front panel and carefully withdraw panel and chassis assembly from cabinet. Place finger through rear cabinet opening to lift up slightly on rear of chassis to clear the internal screw fastenings which secure the protective cabinet feet. The chassis will slide out easily, do not force.

4. Carefully remove the two screws which attach the crystal hold-down bracket to the chassis (left side, in front of power transformer). Note that the top of the bracket is marked A, B, C, D, E to indicate which crystal sockets correspond to the CHANNEL switch positions. The marking REC indicates that Receiver crystals are placed in the left row of sockets and TRAN indicates that the right row of sockets is for transmitter crystals. Each crystal is marked by channel number and by function. For example, a crystal marked R5 is a receiver

crystal for channel 5 and should be used with a transmitter crystal marked T5. Receiver and transmitter crystals must have the same channel number and be placed side-by-side in the crystal sockets to provide operation on that channel.

5. Plug crystals into the crystal sockets being very careful to see that receiver crystals (marked R-) are placed on the left and transmitter crystals (marked T-) on the right and that side-by-side crystals have the same channel number. Record the channel number opposite the channel switch letter on the Transmitter Identification Card, in the space provided, so that you will know which channel numbers are in use in the unit.

6. Replace crystal hold-down cover over crystals using care to see that the self-tapping screws are properly engaged to avoid stripping chassis holes. Avoid over-tightening.

7. DO NOT TAMPER WITH ANY TRANSMITTER ADJUSTMENTS. TO DO SO IS ILLEGAL AND WILL RESULT IN MALFUNCTION OF EQUIPMENT.

8. Carefully re-install chassis in cabinet. Be sure that the protective rubber grommet on the microphone cable is seated in notch in cabinet and cabinet is seated in panel groove. Insert and tighten four cabinet screws at rear of cabinet. Insert antenna plug and power plug. Unit is now ready for operation.

Merely select desired channel of operation by use of the CHANNEL switch. Operation is instantaneous and channels may be changed as often or as rapidly as desired. Avoid operating the Messenger on CHANNEL positions which have no crystals inserted.

Operating Notes

Installation of the Johnson 250-801 Electrical Noise Suppression Kit will effectively suppress the electrical noise produced by the mobile unit in which it is installed, but cannot suppress ignition noise produced by other cars or boats. The interference must be suppressed at the source. In weak signal areas, ignition noise may be heard when cars, trucks, or boats are passing.

In operating from an automobile with a mobile antenna mounted on the left rear, the greatest range will be obtained when the signal path is over the car along a line drawn from the antenna over the right front fender. Thus, when signals fade out as the car proceeds away from the base station, a noticeable improvement is achieved by turning the car toward the base station and "aiming" it so that the line described above points at the base station.

Maximum range will be achieved from high terrain points which avoid the moderate shadowing effect of hills and buildings interposed between stations. The higher the antenna at the base station, the less the shadowing and the greater the range.

When signals are strong, the squelch may be turned as far up (to the right) as possible while still permitting the desired signal to be heard. This will reject weaker signals and reduce interference. Intermittent (in-and-out) signals can result from a "threshold" squelch setting. Turn squelch to left to avoid this effect.

Rough, raspy signals may sometimes be heard. These are caused by medical diathermy and industrial equipments which are operated for the most part between Citizens Radio channels 13 and 14. For this reason, these and adjacent channels are avoided in large municipalities or near medical centers.

Atmospheric conditions sometimes cause "skip" phenomena whereby distant signals hundreds and thousands of miles away can be heard clearly. Nothing can be done to reject these signals which usually last a few minutes or at most a few hours. Normally, strong local signals override skip signals.

Avoid shouting into the microphone. Shouting reduces intelligibility. Keep the microphone against the lips and talk in normal tone of voice.

When operating an automobile at high speeds with the windows open, avoid holding the microphone near a window where it might pick up excessive wind noise.

Service and Maintenance

a) Simple Troubles and Routine Maintenance

Most electronic equipment troubles are the result of tube failures. Although all tubes in the Messenger are operated conservatively and will normally have very long life, tubes should be the first thing checked if trouble develops. However, before removing the cabinet (take out four screws at rear of cabinet - see section under Multi-Channel Operation for details), the fuses should be checked and replaced if burned out. Occasionally, a fuse may burn out due to vibration, yet the Messenger will be functioning perfectly. Proper fuses are listed in the Fuse Chart under section on Power Connections.

The tube types and their positions are shown on the top view of the chassis at the rear of this manual. Some tube testers may indicate a tube as "good" when it actually will not function properly. For this reason, the best procedure is to replace questionable tubes with known good tubes which have been checked, preferably, for proper operation.

The vibrator used in D.C. - A.C. models should be checked after tubes have been checked. Failure of the lower, amber, panel indicator to light may indicate vibrator failure. If vibrator (V1B-1) failure is suspected, a known good vibrator should be plugged into the vibrator socket in place of the suspected one. Do not, however, replace the vibrator without first checking the buffer capacitors, C57 and C58.

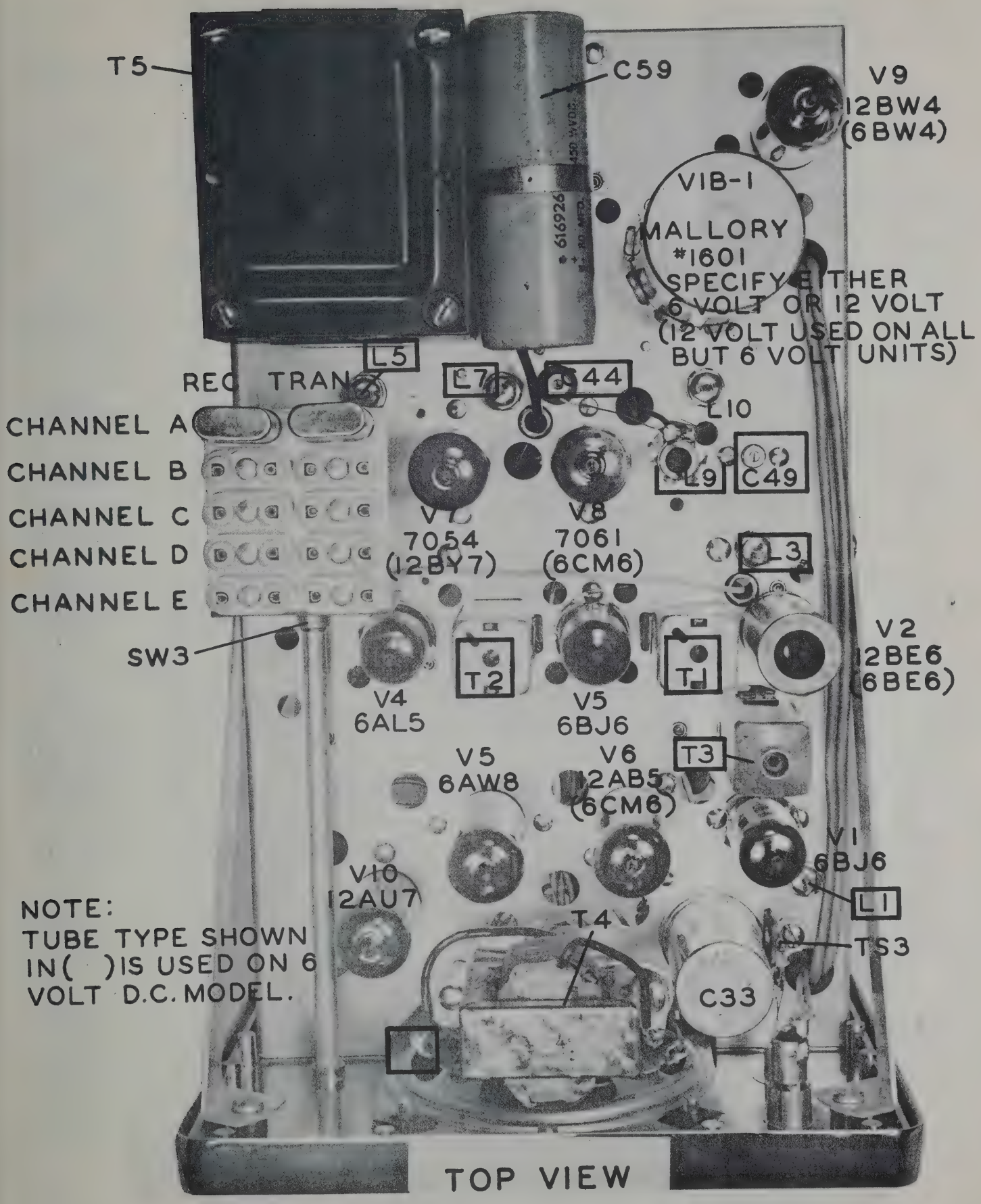
The antenna switching relay, RY1, may require occasional cleaning of contacts particularly if the equipment has not been used for long periods. Simple cleaning consists of placing a narrow, thin piece of paper between the contacts and sliding the paper back and forth several times to burnish or polish the contacts. Carefully depress the moving contact of the relay to facilitate insertion of the paper when cleaning the "at rest" contacts and press the moving contact against the paper when cleaning the opposite contacts so the paper will polish both the movable and fixed contacts. Do not use sandpaper or other abrasive papers for cleaning contacts.

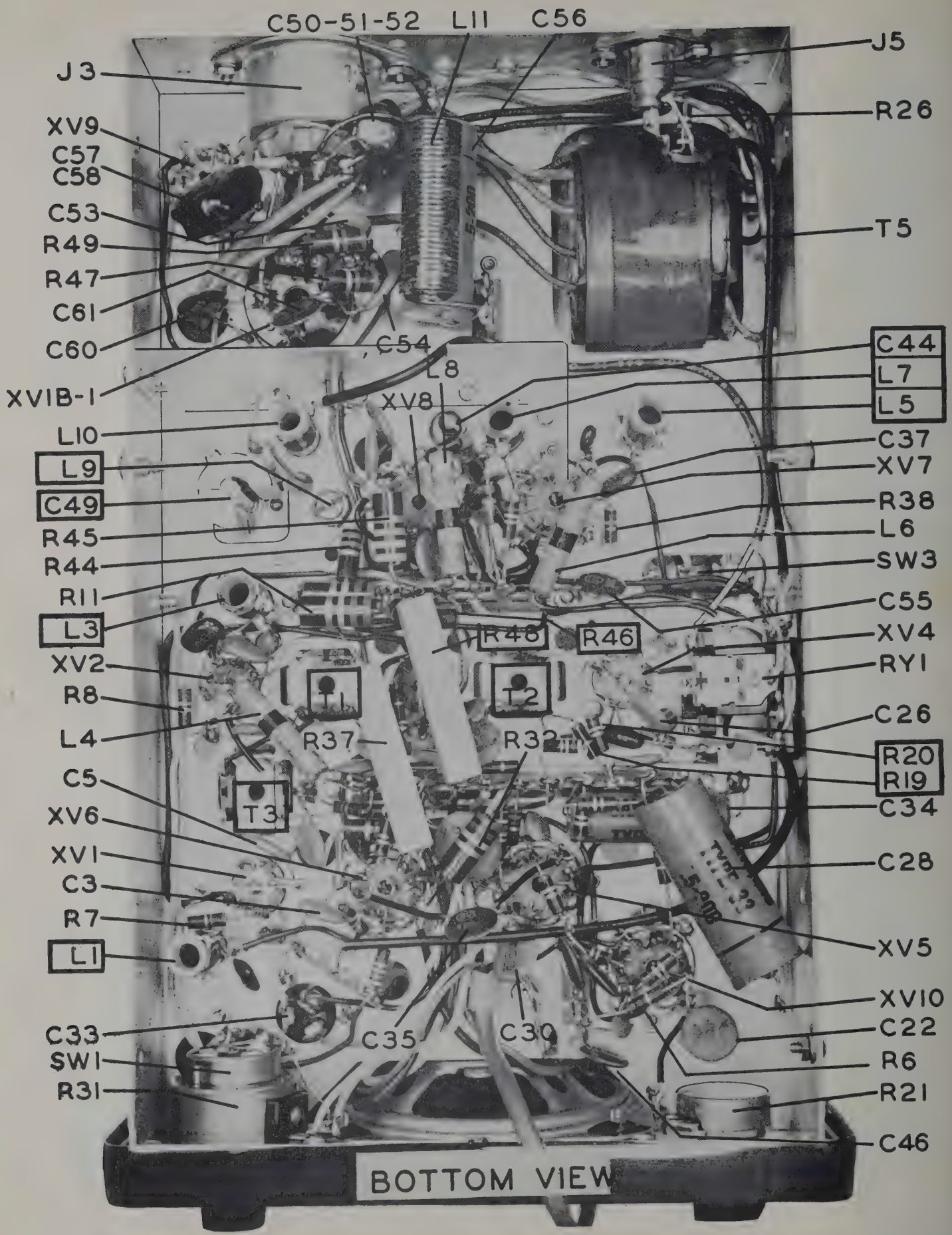
Routine maintenance should include yearly checking of tubes and vibrator and periodic dusting of cabinet. Settled dust on the chassis should occasionally be blown out by use of an air hose or vacuum cleaner, reversed for air pressure' instead of suction.

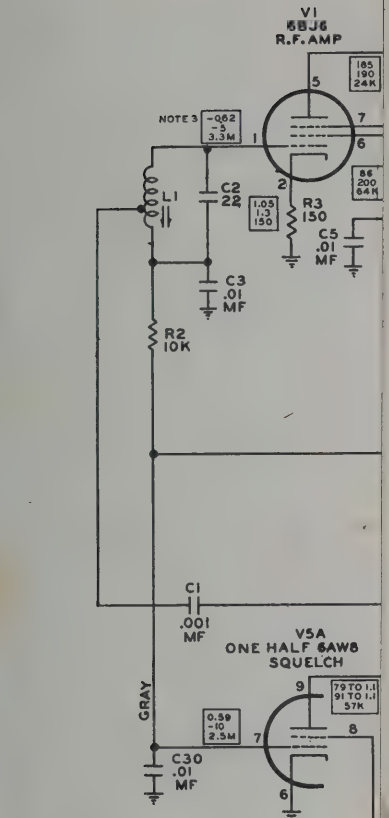
It is recommended that qualified service technicians be used for trouble shooting whenever possible. However, if they are not available, trouble shooting by inexperienced persons should be limited to fuse, tube and vibrator replacement.

DO NOT TAMPER WITH ANY INTERNAL ADJUSTMENTS. DOING SO WILL LEAD TO MALFUNCTION OF EQUIPMENT. ONLY QUALIFIED TECHNICIANS, WITH PROPER TEST EQUIPMENT, SHOULD ATTEMPT TO MAKE BASIC ALIGNMENT AND TUNING ADJUSTMENTS.

Consult the classified section of your telephone directory under Radio Communication Equipment or Radio Telephone Equipment for the nearest General Electric Two-Way Radio Service Station. He is fully qualified to install or service Johnson Viking Messenger transceivers and accessories.


T5
C59
V9
12BW4
(6BW4)
VIB-1
MALLORY
#1601
SPECIFY EITHER
6 VOLT OR 12 VOLT
(12 VOLT USED ON ALL
BUT 6 VOLT UNITS)
L5
L7
C44
L10
REC
TRAN
CHANNEL A
CHANNEL B
CHANNEL C
CHANNEL D
CHANNEL E
L9
C49
V7
7054
(12BY7)
V8
7061
(6CM6)
L3
SW3
V2
12BE6
(6BE6)
T2
T1
V4
6AL5
V5
6BJ6
T3
V5
6AW8
V6
12AB5
(6CM6)
V1
6BJ6
V10
12AU7
L1
T4
TS3
C33
NOTE:
TUBE TYPE SHOWN
IN( )IS USED ON 6
VOLT D.C. MODEL.
TOP VIEW


C50-51-52
L11
C56
J5
J3
R26
XV9
C57
C58
T5
C53
R49
R47
C61
C60
C54
L8
C44
L7
L5
XV8
XVIB-1
L10
C37
L9
XV7
C49
R38
R45
L6
R44
SW3
R11
C55
L3
R48
R46
XV4
XV2
RY1
T2
R8
C26
L4
R37
R32
R20
R19
C5
T3
C34
XV6
XV1
C28
C3
R7
XV5
L1
XV10
C33
C35
C30
C22
SW1
R6
R31
R21
C46
BOTTOM VIEW



NOTES: 1. VOLTAGE AND RESISTANCE TO CHASSIS MEASURED WITH VTVM, NO SIGNAL, NO MODULATION, A C OPERATION

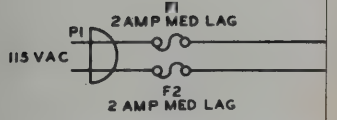
50 / 9 / INF / 270 — TOP FIGURE IS VOLTAGE IN RECEIVE CONDITION. 2ND FIGURE IS VOLTAGE IN TRANSMIT CONDITION. 3RD FIGURE IS RESISTANCE, SW2 ON RECEIVE. 4TH FIGURE IS RESISTANCE, SW2 ON TRANSMIT.

K MEANS THOUSAND. INF MEANS INFINITE.
M MEANS MILLION.
— MEANS NO DATA.

2. CAPACITOR CHARGES ON RESISTANCE MEASUREMENTS.

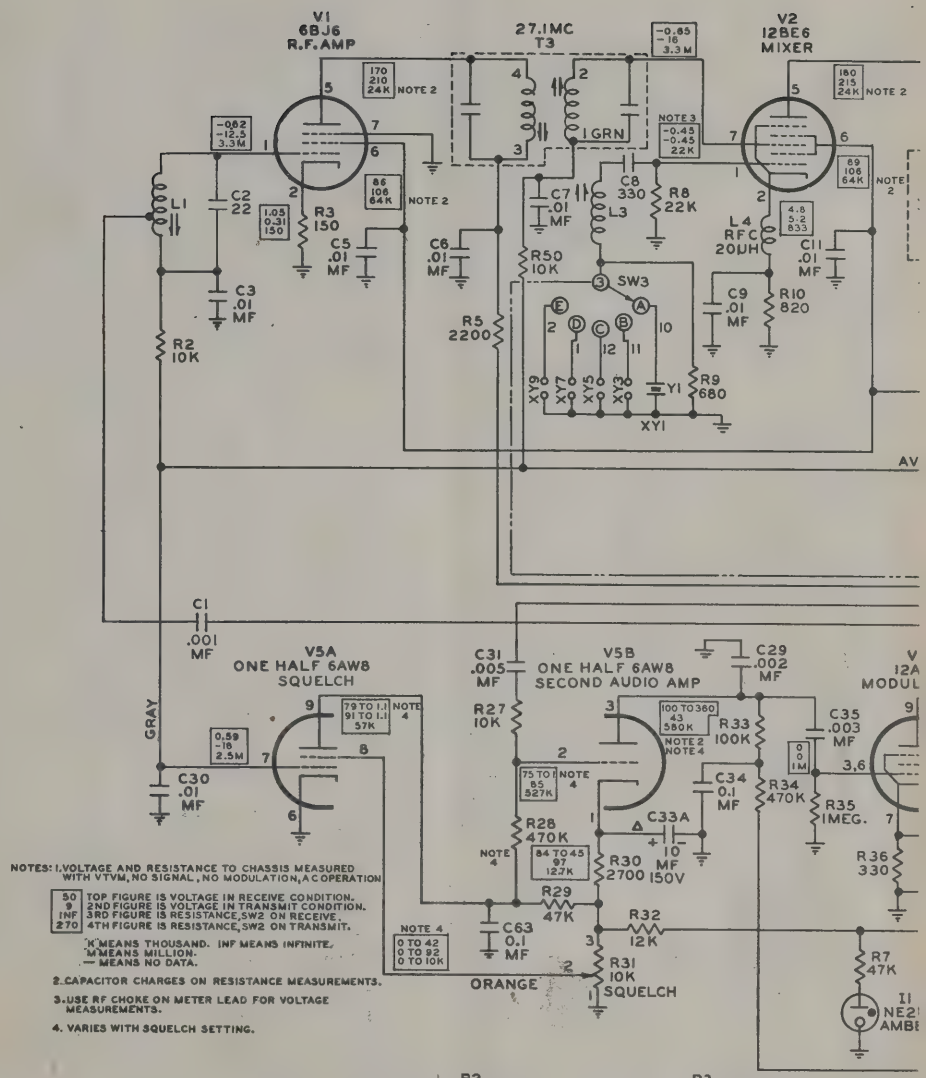
3. USE RF CHOKE ON METER LEAD FOR VOLTAGE MEASUREMENTS.

4. VARIES WITH SQUELCH SETTING.



NOTE: UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE GIVEN IN OHMS & ALL CAPACITANCE VALUES ARE GIVEN IN MICRO-MICROFARAD

TAP SWITCHES ARE SHOWN IN EXTREME COUNTER CLOCKWISE POSITION AS VIEWED FROM SHAFT END



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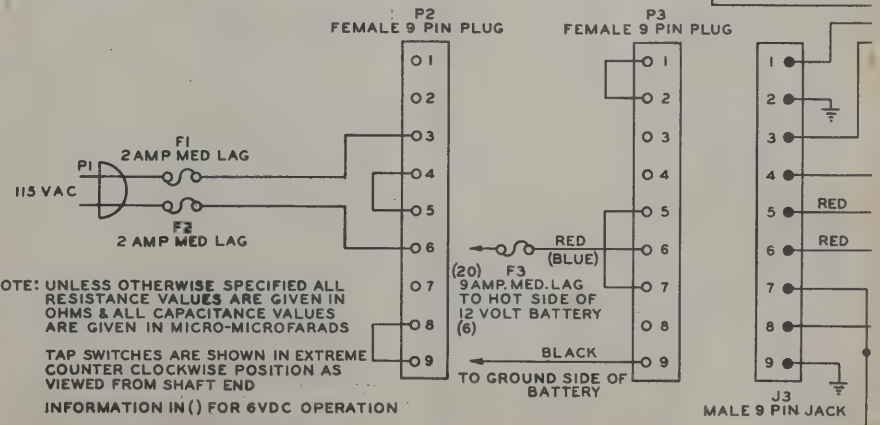

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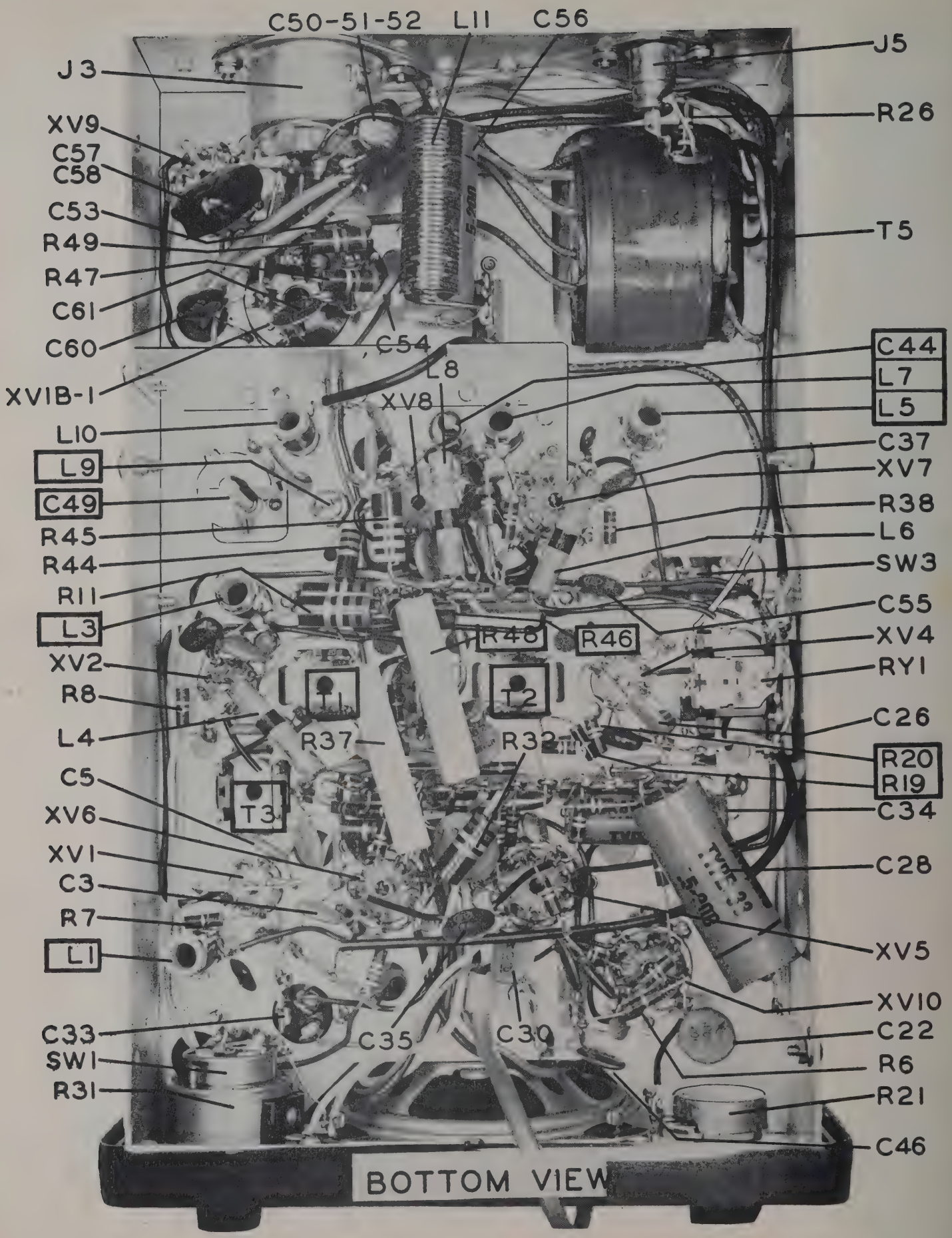
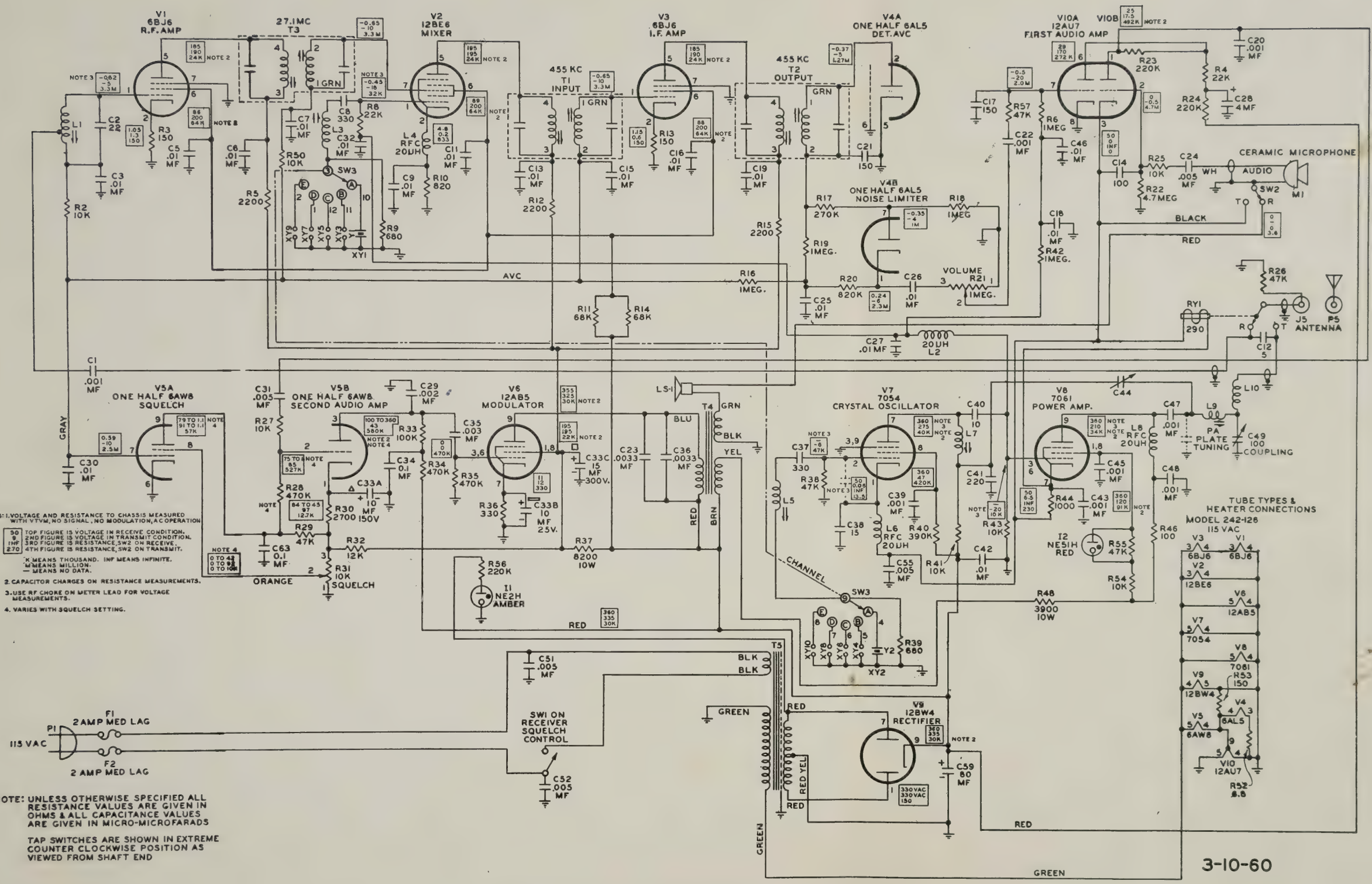
INFORMATION IN ( ) FOR 6VDC OPERATION

* DELETED FOR 6VDC OPERATION

JOHN


C50-51-52
L11
C56
J3
J5
XV9
R26
C57
C58
C53
T5
R49
R47
C61
C60
C54
L8
C44
L7
L5
XV8
XVIB-1
L10
C37
L9
XV7
C49
R38
R45
L6
R44
SW3
R11
C55
L3
R48
R46
XV4
XV2
RY1
R8
T1
T2
C26
L4
R37
R32
R20
R19
C5
T3
C34
XV6
XV1
C28
C3
R7
XV5
L1
XV10
C33
C35
C30
C22
SW1
R6
R31
R21
C46
BOTTOM VIEW



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3. USE RF CHOKE ON METER LEAD FOR VOLTAGE MEASUREMENTS.

4. VARIES WITH SQUELCH SETTING.

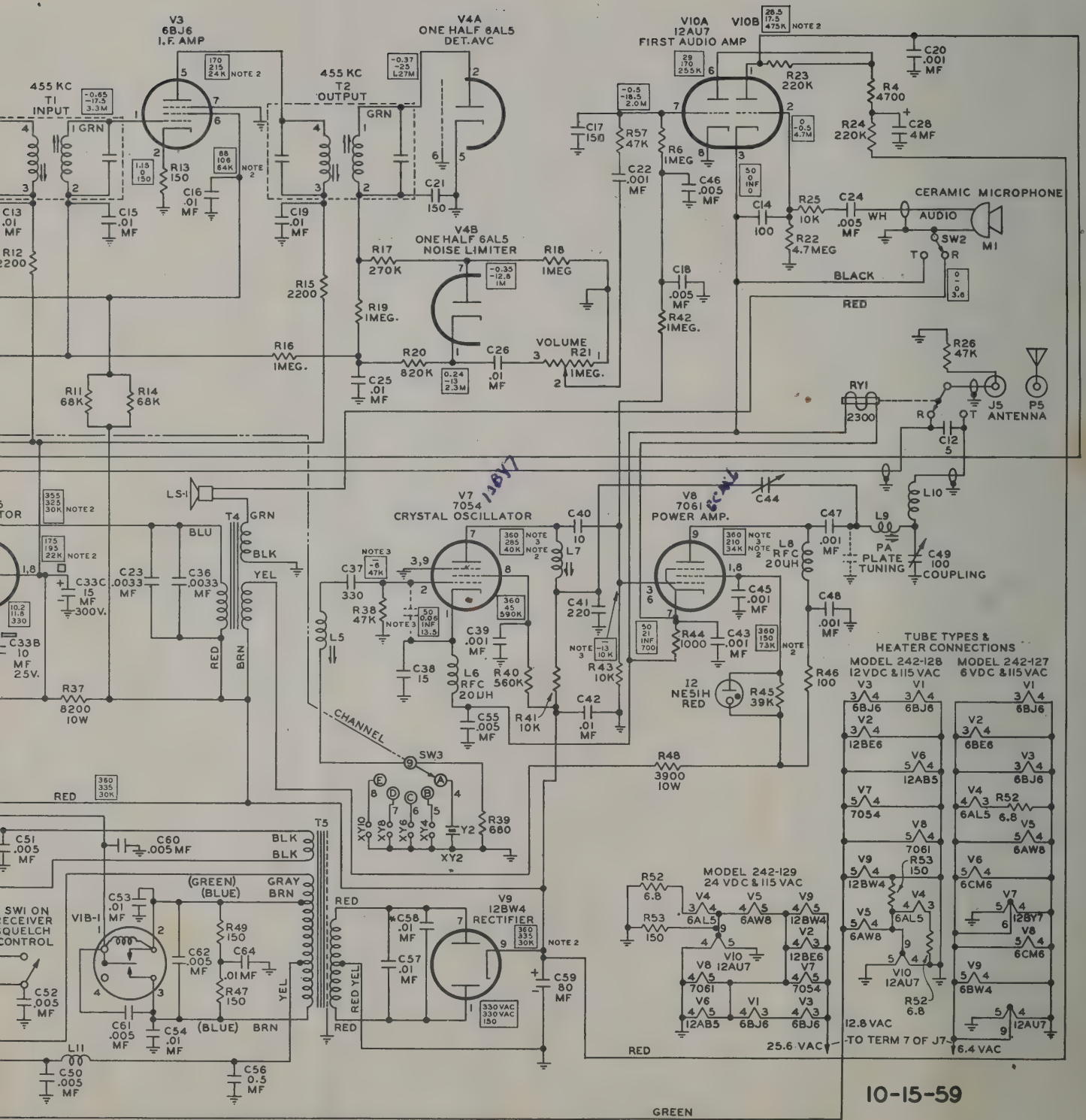
NOTE: UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE GIVEN IN OHMS & ALL CAPACITANCE VALUES ARE GIVEN IN MICRO-MICROFARADS

TAP SWITCHES ARE SHOWN IN EXTREME COUNTER CLOCKWISE POSITION AS VIEWED FROM SHAFT END

3-10-60

JOHNSON VIKING MESSENGER SCHEMATIC

MODEL 242-126



SON VIKING MESSENGER SCHEMATIC

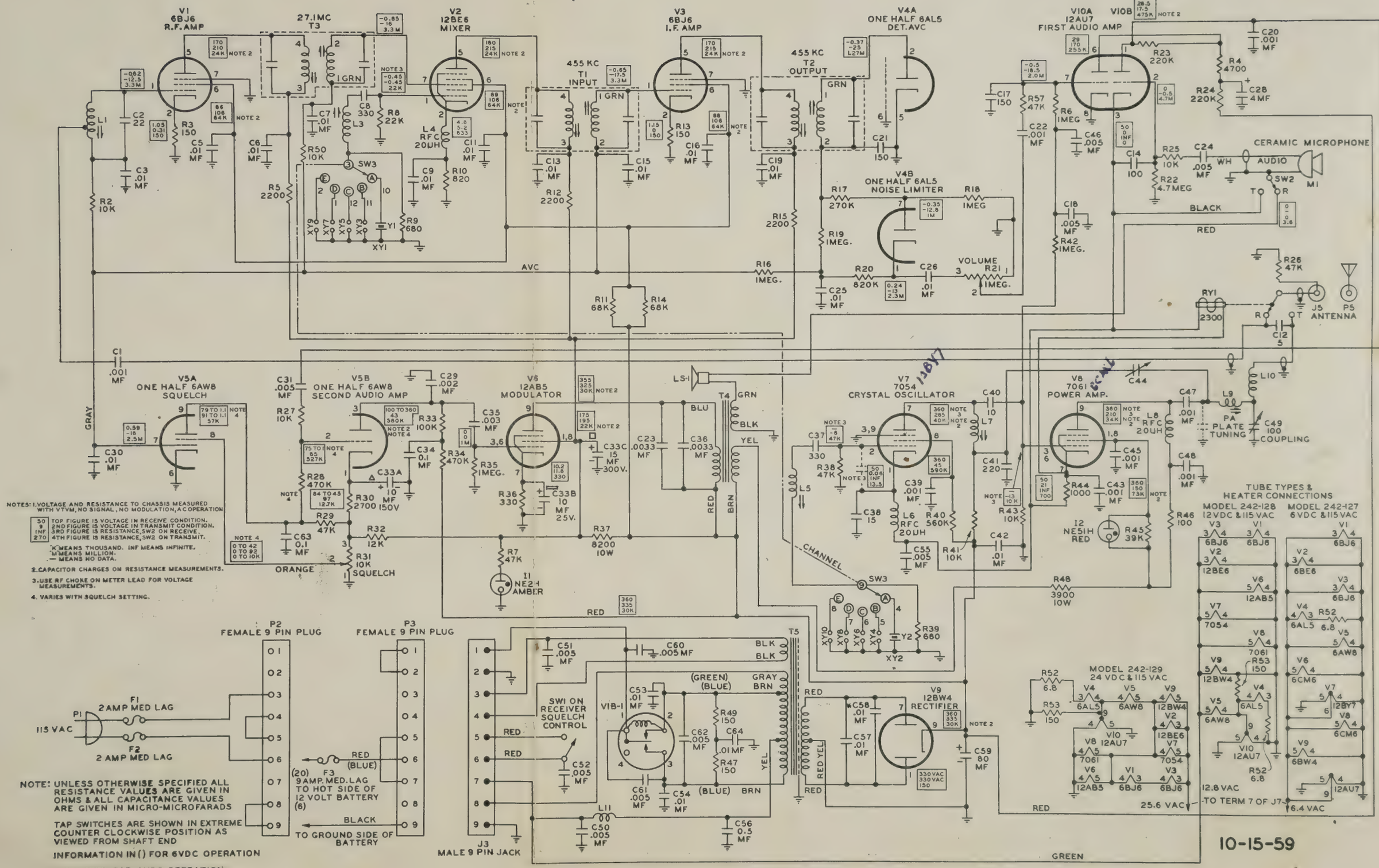
CHANNEL-CRYSTAL LIST

JOHNSON PART NO.	CHANNEL	FREQUENCY (MEGACYCLES)	
250-901	1	26.965	
-902	2	26.975	
-903	3	26.985	
-904	4	27.005	
-905	5	27.015	
-906	6	27.025	
-907	7	27.035	
-908	8	27.055	
-909	9	27.065	
-910	10	27.075	
-911	11	27.085	
-912	12	27.105	
-913	13	27.115	
-914	14	27.125	
-915	15	27.135	
-916	16	27.155	
-917	17	27.165	
-918	18	27.175	
-919	19	27.185	
-920	20	27.205	
-921	21	27.215	
-922	22	27.225	
-923	23	27.255	(shared with remote control and other services)

The Johnson part number covers a set of two crystals, one for the receiver and one for the transmitter.

IMPORTANT

Only crystals approved by Johnson should be used. Use of other crystals may cause illegal off-frequency or improper operation. Warranty is voided if other than Johnson approved crystals are used in the Messenger.



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9	2ND FIGURE IS VOLTAGE IN TRANSMIT CONDITION.
INF	3RD FIGURE IS RESISTANCE, SW2 ON RECEIVE.
270	4TH FIGURE IS RESISTANCE, SW2 ON TRANSMIT.

"K" MEANS THOUSAND. INF MEANS INFINITE.
"M" MEANS MILLION.
— MEANS NO DATA.

2. CAPACITOR CHARGES ON RESISTANCE MEASUREMENTS.
3. USE RF CHOKE ON METER LEAD FOR VOLTAGE MEASUREMENTS.
4. VARIES WITH SQUELCH SETTING.

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TAP SWITCHES ARE SHOWN IN EXTREME COUNTER CLOCKWISE POSITION AS VIEWED FROM SHAFT END

INFORMATION IN ( ) FOR 6VDC OPERATION

* DELETED FOR 6VDC OPERATION

10-15-59

JOHNSON VIKING MESSENGER SCHEMATIC

CHANNEL-CRYSTAL LIST

JOHNSON PART NO.	CHANNEL	FREQUENCY (MEGACYCLES)	
250-901	1	26.965	
-902	2	26.975	
-903	3	26.985	
-904	4	27.005	
-905	5	27.015	
-906	6	27.025	
-907	7	27.035	
-908	8	27.055	
-909	9	27.065	
-910	10	27.075	
-911	11	27.085	
-912	12	27.105	
-913	13	27.115	
-914	14	27.125	
-915	15	27.135	
-916	16	27.155	
-917	17	27.165	
-918	18	27.175	
-919	19	27.185	
-920	20	27.205	
-921	21	27.215	
-922	22	27.225	
-923	23	27.255	(shared with remote control and other services)

The Johnson part number covers a set of two crystals, one for the receiver and one for the transmitter.

IMPORTANT

Only crystals approved by Johnson should be used. Use of other crystals may cause illegal off-frequency or improper operation. Warranty is voided if other than Johnson approved crystals are used in the Messenger.

"10" Signals

"10" signals are used to save time, improve understanding and reduce interference. Their use is explained in the section on Operation.

10-1	Unable to copy
10-2	Signals good
10-3	Affirmative-Granted-Will do
10-4	Message received
10-6	Busy, stand by
10-9	Repeat
10-13	Weather and road conditions
10-14	Correct time
10-16	Pick up ..... at .....
10-18	Anything for us
10-19	Nothing for you
10-20	Location
10-24	Finished with last assignment
10-25	Disregard last information
10-91	Too weak, talk closer to mike
10-92	Too loud, talk farther from mike
10-94	Give a short test (for setting squelch or checking operation)

E. F. JOHNSON COMPANY
WASECA, MINNESOTA

VIKING "MESSENGER" ANTENNAS AND ACCESSORIES

BASE STATION ANTENNAS

137-803-1 Low-cost ground plane antenna with insulators, guy wire, plated hardware, 50 feet of coaxial transmission line, connectors and instructions. Complete except user provides 2" x 4" wood mast. **$13.90 each**

137-803-2 Same as above except with 100 feet of coaxial transmission line. **$18.00 each**

137-808 Ground plane antenna complete with cadmium plated mounting bracket and hardware. Removable vertical radiator and radials are solid aluminum rod - mounts on standard 1 inch pipe. With instructions, less transmission line.....base accepts PL-259 connector. $19.95 each

142-801-1 50 feet of coaxial lead-in for use with 137-808. **$ 6.95 each**

142-801-2 100 feet of coaxial lead-in for use with 137-808. **$10.75 each**

MOBILE ANTENNAS

137-805 Mobile bumper mount antenna assembly includes: Cadmium plated steel double chain bumper mount and spring, 102" stainless steel whip antenna, 20 feet of coaxial transmission line and instructions. $25.95 each

137-806 Mobile antenna assembly for car, truck or boat deck mount. (use for maximum range) Includes: aluminum base with one piece insulator, cadmium plated spring, 102" stainless steel ship antenna, 20 feet of coaxial transmission line and instructions. $27.60 each

137-807 Convenient portable and mobile gutter clamp-on type antenna assembly complete with hardware, 40" whip with vinyl covered loading coil, 12 feet of coaxial transmission line and instructions. $13.75 each

COMPACT PORTABLE ANTENNAS

137-804 High efficiency short collapsible chrome plated whip antenna mounts directly on back of transceiver for up to 10 miles range...may be easily detached. $ 5.95 each

137-807 (see above)

ACCESSORIES

250-801 Automotive or marine noise suppression kit. Effectively filters and suppresses noise generated by ignition and electrical system. $13.50 each

250-901 thru 250-923 Crystals in matched pairs for channels 1 thru 23. $ 7.95 per pair

251-828 Universal dash mounting kit for securing transceiver under dashboard of car, truck or boat. $ 2.50 each

251-830 Sturdy etched aluminum transceiver carrying handle. Easily mounted - convenient swing-away feature when not in use. $ 1.50 each